

Exhibit 300: Capital Asset Summary

Part I: Summary Information And Justification (All Capital Assets)

Section A: Overview & Summary Information

Date Investment First Submitted: 2009-06-30
Date of Last Change to Activities: 2012-04-30
Investment Auto Submission Date: 2012-02-28
Date of Last Investment Detail Update: 2012-02-28
Date of Last Exhibit 300A Update: 2012-04-30
Date of Last Revision: 2012-08-16

Agency: 006 - Department of Commerce **Bureau:** 48 - National Oceanic and Atmospheric Administration

Investment Part Code: 01

Investment Category: 00 - Agency Investments

1. Name of this Investment: NOAA/OCIO/ NOAA R&D High Performance Computing System

2. Unique Investment Identifier (Ull): 006-000380400

Section B: Investment Detail

- 1. Provide a brief summary of the investment, including a brief description of the related benefit to the mission delivery and management support areas, and the primary beneficiary(ies) of the investment. Include an explanation of any dependencies between this investment and other investments.**

This investment provides the computational resources necessary to support continued advances in the environmental modeling capabilities and addresses other HPC requirements that may arise within NOAA and at other partner agencies. IT capital investment includes the HPC systems, complementary storage devices and interconnects, communications hardware interfaces, software, networking equipment, system maintenance, support services, IT security, and necessary infrastructure enhancements. This Exhibit represents a coordinated and centralized capital planning effort for three NOAA HPC organizations, and is intended to improve the acquisition process and to achieve economies of scale through consolidation of system requirements and a reduced number of individual acquisitions. NOAA's R&D HPCS resources enable scientists to attack long-lead-time problems associated with the physical processes that govern the behavior of the atmosphere and the ocean. Advanced climate models are the only means for distinguishing between natural and forced climate variations, assessing future impacts, and hence providing a capability to adapt to climate change and to explore mitigation strategies. These models are crucial for understanding some of the most critical climate issues of today. Major economic decisions of national importance are being made on issues impacted by climate without being based on the best possible science. These resources will also be utilized for a number of shorter-range meteorological research projects, including the development of next generation weather and climate forecast models,

National Test Bed, and Satellite Data Assimilation projects. They will also facilitate applied meteorological research and development for purposes of improving and creating short-term warning and weather forecast systems, Hurricane Forecast Improvement, models, and observing technology.

2. How does this investment close in part or in whole any identified performance gap in support of the mission delivery and management support areas? Include an assessment of the program impact if this investment isn't fully funded.

NOAA has a gap between the requirements for Research and Development (R&D) High Performance Computing (HPC) and the R&D HPC resources that are available. From a climate modeling perspective the software to increase model resolution, resolve the stratosphere, add global carbon cycle, and add chemistry to address air quality and global climate change is ready. What is lacking is the necessary HPC capacity to run this software to the levels required to realize the maximum benefits and timescales that the models can provide. The NOAA Science Advisory Board established requirements to improve hurricane track and intensity forecasts. One requirement is to reduce the error in a 48 hour forecast; another is to produce 1 km resolution hurricane forecasts. Both of these requirements require computational resources that exceed NOAA's current HPC capabilities. The existing NOAA R&D HPC resources allow NOAA to make steady progress in meeting the above mentioned requirements, and others, but at a slower pace than what NOAA scientists and other stakeholders require. If the R&D program is not fully funded then the program will need to cut back on the available HPC resources that can be provided to its stakeholders. This would translate to such things as reductions in available computing hours that could be made available to NOAA scientists, reduction in network capabilities, impacts to the overall HPC infrastructure components (i.e. facility, security, support services, contracts, and contract support). The gap between requirements and resources would widen.

3. Provide a list of this investment's accomplishments in the prior year (PY), including projects or useful components/project segments completed, new functionality added, or operational efficiency achieved.

Increase Number of regional scale projections for assessments & decision support from 2 to 3 per year. Increase Oak Ridge research system peak computational performance from 260 TF to 980 TF. Complete construction and begin operations in the NOAA Environmental Security Computing Center (NESCC) in Fairmont, WV. Deliver, install, and test new 333 TF development system at the NESCC. Complete N-WAVE network and begin operations. Deliver and install new augmentation to Hurricane Forecast Improvement (HFIP) R&D system.

4. Provide a list of planned accomplishments for current year (CY) and budget year (BY).

CY: NESCC development system becomes operational. HFIP R&D augmentation becomes operational. Increase Oak Ridge research system peak computational performance from 980 TF to 1,106 TF (1 PF). Eliminate R&D computer operations at vendor provided facility in Gaithersburg, MD. Decrease Percentage of uncertainty in possible 21st century sea level rise (0-1m = 100% uncertainty). Improved treatment of key physical processes in climate models aimed at improving: model performance, understanding of uncertainties, and confidence in

climate change projections and predictions. Deliver next HFIP R&D system augmentation. BY: Increase Cumulative number of new decadal prototype forecasts and predictions made with high-resolution coupled climate model. Increase Number of regional scale projections for assessments & decision support from 5 to 7. HFIP R&D augmentation becomes operational.

5. **Provide the date of the Charter establishing the required Integrated Program Team (IPT) for this investment. An IPT must always include, but is not limited to: a qualified fully-dedicated IT program manager, a contract specialist, an information technology specialist, a security specialist and a business process owner before OMB will approve this program investment budget. IT Program Manager, Business Process Owner and Contract Specialist must be Government Employees.**

2009-05-15

Section C: Summary of Funding (Budget Authority for Capital Assets)

1.

Table I.C.1 Summary of Funding

	PY-1 & Prior	PY 2011	CY 2012	BY 2013
Planning Costs:	\$0.0	\$0.0	\$0.0	\$0.0
DME (Excluding Planning) Costs:	\$165.0	\$0.0	\$0.0	\$0.0
DME (Including Planning) Govt. FTEs:	\$0.0	\$0.0	\$0.0	\$0.0
Sub-Total DME (Including Govt. FTE):	\$165.0	0	0	0
O & M Costs:	\$105.6	\$26.2	\$27.0	\$26.9
O & M Govt. FTEs:	\$8.9	\$3.8	\$3.9	\$4.0
Sub-Total O & M Costs (Including Govt. FTE):	\$114.5	\$30.0	\$30.9	\$30.9
Total Cost (Including Govt. FTE):	\$279.5	\$30.0	\$30.9	\$30.9
Total Govt. FTE costs:	\$8.9	\$3.8	\$3.9	\$4.0
# of FTE rep by costs:	57	23	23	23
Total change from prior year final President's Budget (\$)		\$29.9	\$30.9	
Total change from prior year final President's Budget (%)		0.00%	0.00%	

2. If the funding levels have changed from the FY 2012 President's Budget request for PY or CY, briefly explain those changes:

The prior funding summary was submitted while NOAA's American Reinvestment and Recovery Act (ARRA) spend plan and FY10 OMB submission were not yet complete. The initial Exhibit 300 included FY10 funds for Decadal climate predictions (\$4.8M specifically for high performance computing). These funds were removed from the FY10 submission upon completion of the ARRA spend plan. \$165M of funding was provided by ARRA.

Section D: Acquisition/Contract Strategy (All Capital Assets)

Table I.D.1 Contracts and Acquisition Strategy

Contract Type	EVM Required	Contracting Agency ID	Procurement Instrument Identifier (PIID)	Indefinite Delivery Vehicle (IDV) Reference ID	IDV Agency ID	Solicitation ID	Ultimate Contract Value (\$M)	Type	PBSA ?	Effective Date	Actual or Expected End Date
Awarded		DG133010CN0098									
Awarded		DG133010NC0870									
Awarded		DG133010CN0292									
Awarded		DG133010CN0306									
Awarded		RA133R11SE0687									
Awarded		DG133010CQ0014									
Awarded		RA133011NC0374									
Awarded		DG133010CN0068									
Awarded		DG133010CN0079									
Awarded		DG133010CN0080									

2. If earned value is not required or will not be a contract requirement for any of the contracts or task orders above, explain why:

These contracts do not involve any development work. These contracts are used to acquire COTS HW and SW components along with support and network services.

Exhibit 300B: Performance Measurement Report

Section A: General Information

Date of Last Change to Activities: 2012-04-30

Section B: Project Execution Data

Table II.B.1 Projects

Project ID	Project Name	Project Description	Project Start Date	Project Completion Date	Project Lifecycle Cost (\$M)
3804M09001	Development facility	Facility construction project to build a HPC center in an existing facility located in Fairmont, WV. Facility name: NOAA Environmental Security Computing center (NESCC).			
3804M09002	Research HPC-ORNL	ORNL provides computer center operations and collaborative support for NOAA so as to deliver improved climate data and model experiments.			
3804M10003	R&D HPCS	Acquire, deliver, and install HPCs, climate post processing compute resources, and HSM.			
3804M11004	Hurricane Forecast Improvement (HFIP)	Acquire, deliver, and install HPC to support HFIP.			
3804M11005	GFDL Data Portal	Acquire, install, and integrate data portal equipment to support data transfers from GAEA HPC.			
3804M11007	FY12 Hurricane Forecast Improvement (HFIP)	Provide management services, system integration and technical expertise necessary to deliver, install, test and maintain an upgrade to the HFIP computer			

Table II.B.1 Projects

Project ID	Project Name	Project Description	Project Start Date	Project Completion Date	Project Lifecycle Cost (\$M)
		system including those currently.			

Activity Summary

Roll-up of Information Provided in Lowest Level Child Activities

Project ID	Name	Total Cost of Project Activities (\$M)	End Point Schedule Variance (in days)	End Point Schedule Variance (%)	Cost Variance (\$M)	Cost Variance (%)	Total Planned Cost (\$M)	Count of Activities
3804M09001	Development facility							
3804M09002	Research HPC-ORNL							
3804M10003	R&D HPCS							
3804M11004	Hurricane Forecast Improvement (HFIP)							
3804M11005	GFDL Data Portal							
3804M11007	FY12 Hurricane Forecast Improvement (HFIP)							

Key Deliverables

Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days)	Schedule Variance (%)
3804M09001	Acquisition and Award	Award construction contract through GSA for NESCC buildout	2010-08-31	2010-08-31	2010-08-31	441	0	0.00%
3804M09002	Phase I HPC service	Acquire, install, and deliver initial HPC resources	2010-10-29	2010-10-29	2010-10-29	498	0	0.00%
3804M10003	Install and configure PP&A	Installation, configuration, and integration of PP&A of PP&A	2010-12-20	2010-12-20	2010-12-20	53	0	0.00%
3804M10003	PP&A Acceptance testing	Perform acceptance testing of PP&A cluster	2011-01-21	2011-01-21	2011-01-21	31	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days)	Schedule Variance (%)
3804M10003	Archive Acquisition	source selection and contract award of R&D HSMS and tape library	2011-03-03	2011-03-03	2011-03-03	41	0	0.00%
3804M10003	Acquisition of Post Processing and Analysis (PP&A) cluster	Acquire PP&A cluster	2011-03-23	2011-03-23	2011-03-23	174	0	0.00%
3804M09001	Third Floor tape archive	Construct computer room on 3rd floor to support tape archive libraries and other infrastructure components.	2011-04-06	2011-04-06	2011-04-06	117	0	0.00%
3804M10003	Acquire LSC	Select vendor and award LSC contract	2011-04-29	2011-04-29	2011-04-29	197	0	0.00%
3804M10003	Acquisition of HSMS and tape library	Acquire HSMS software, infrastructure, and tape library.	2011-05-04	2011-05-04	2011-05-04	252	0	0.00%
3804M10003	Install and configure HSMS and tape library	Install HSMS and tape library	2011-05-04	2011-05-04	2011-05-04	189	0	0.00%
3804M09001	Fabrication and Delivery	Order, fabricate, and receive major equipment for the facility.	2011-06-06	2011-06-29	2011-06-29	150	-23	-15.33%
3804M10003	Install and Configure Archive	Deliver, Install, and configure tape library HW and SW	2011-07-05	2011-07-05	2011-07-05	148	0	0.00%
3804M10003	Archive Acceptance testing	Acceptance testing of HSMS and tape library	2011-08-31	2011-08-31	2011-08-09	61	22	36.07%
3804M09001	Building Commissioning	Conduct Level 4 and 5 commissioning tests and make any needed modifications/corrections	2011-09-09	2011-09-09	2011-10-05	32	-26	-81.25%
3804M10003	Archive Acceptance	Perform acceptance	2011-09-22	2011-09-22	2011-09-22	30	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days)	Schedule Variance (%)
	testing	test of HSMS and tape archive. All HW and SW components.						
3804M11004	Acquire storage systems	Acquire, deliver, and install storage system	2011-10-01	2011-11-18	2011-09-09	144	22	15.28%
3804M11004	Acquire large scale compute (LSC) system	Acquire, deliver, install and integrate LSC	2011-11-01	2011-12-30	2011-12-01	30	-30	-100.00%
3804M10003	Install and configure LSC	Deliver, install, and configure LSC	2011-11-03	2012-01-30	2012-01-30	169	-88	-52.07%
3804M11004	LSC Acceptance testing	Perform acceptance testing of LSC and storage	2011-12-02	2011-12-02	2011-12-12	30	-10	-33.33%
3804M09002	Phase II upgrade	Upgrade HPC system to ~900TF	2011-12-14	2011-12-14	2011-12-14	316	0	0.00%
3804M09001	Facility Acceptance	NOAA takes over operations of the NESCC facility	2011-12-15	2011-12-15	2011-12-15	84	0	0.00%
3804M11005	Acquire and deliver data portal equipment	Acquire and deliver data portal equipment	2012-01-09	2012-01-09	2012-01-09	69	0	0.00%
3804M11005	Install and integrate data portal equipment	Install and integrate data portal equipment	2012-01-13	2012-01-13	2012-01-13	1	0	0.00%
3804M10003	LSC Acceptance Test	Test all of the LSC HW and SW components.	2012-02-28	2012-03-02	2012-03-02	138	-3	-2.17%
3804M11005	Perform functional and acceptance tests	Perform functional and acceptance tests	2012-02-29	2012-02-29	2012-03-06	44	-6	-13.64%
3804M11007	Acquire large scale compute (LSC) system	Acquire, deliver, install and integrate LSC	2012-08-31	2012-08-31		168	0	0.00%

Section C: Operational Data

Table II.C.1 Performance Metrics

Metric Description	Unit of Measure	FEA Performance Measurement Category Mapping	Measurement Condition	Baseline	Target for PY	Actual for PY	Target for CY	Reporting Frequency
ORNL HPC System Availability	%	Technology - Reliability and Availability	Over target	96.000000	96.000000		96.000000	Monthly
Percentage uncertainty in possible 21st century sea level rise (0-1m = 100% uncertainty)	percentage (%)	Mission and Business Results - Services for Citizens	Under target	74.000000	55.000000		65.000000	Semi-Annual
Improved treatment of key physical processes in climate models aimed at improving: model performance, understanding of uncertainties, and confidence in climate change projections and predictions.	Number of improvements	Mission and Business Results - Services for Citizens	Over target	0.000000	6.000000		3.000000	Semi-Annual
HPC Data Availability	%	Technology - Reliability and Availability	Over target	99.000000	99.000000		99.000000	Monthly
Computational Hours made available to users (in Millions)	millions of hrs per month	Customer Results - Service Accessibility	Over target	34.897000	34.897000		101.675000	Monthly
Climate: Cumulative number of new decadal prototype forecasts and predictions made with high-resolution coupled climate model	Number of Forecasts	Mission and Business Results - Services for Citizens	Over target	0.000000	2.000000		1.000000	Semi-Annual
Climate: Number of regional scale projections for assessments &	Number of Projections	Mission and Business Results - Services for Citizens	Over target	2.000000	4.000000		3.000000	Semi-Annual

Table II.C.1 Performance Metrics								
Metric Description	Unit of Measure	FEA Performance Measurement Category Mapping	Measurement Condition	Baseline	Target for PY	Actual for PY	Target for CY	Reporting Frequency
decision support								
Fairmont HPC System Availability	%	Technology - Reliability and Availability	Over target	96.000000	96.000000		96.000000	Monthly